

Blue Laser Based on Frequency-Quadrupled Tm:Lu2O3, Phase I

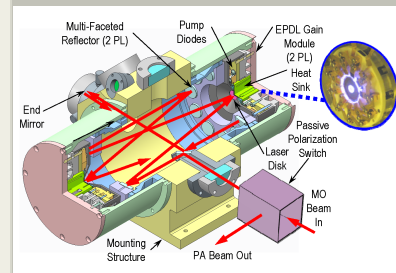
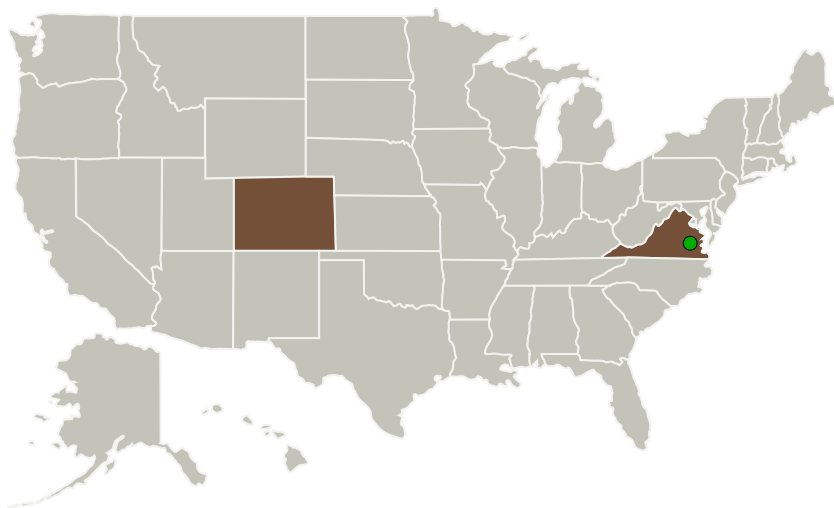
Completed Technology Project (2016 - 2016)



Project Introduction

Aqwest proposes to develop a novel, compact and rugged high-peak power blue laser in the 0.45-0.49 μm range. The innovative blue laser is based on a frequency-quadrupling of 1.9- μm laser output from ceramic Tm:Lu2O3, a novel high-performance solid-state laser (SSL) material that is now becoming commercially available. The project will adapt our novel and highly successful edge-pumped disk laser / multi-passed amplifier architecture we developed for the US Army, Navy, and the Department of Energy (DOE). In Phase I, we will use our existing suite of Tm laser models to determine the feasibility of the subject blue laser and identify preferred operating regimes. We will also fabricate a composite Tm:Lu2O3 laser disk using the ceramic material now being produced for Aqwest, and laser test it under relevant condition in our existing test bed to characterize performance at 1.9- μm wavelength. In Phase II, we will develop and demonstrate a full-scale blue laser prototype.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Aqwest, LLC	Lead Organization	Industry	Larkspur, Colorado
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

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Primary U.S. Work Locations

Colorado

Virginia

Project Transitions

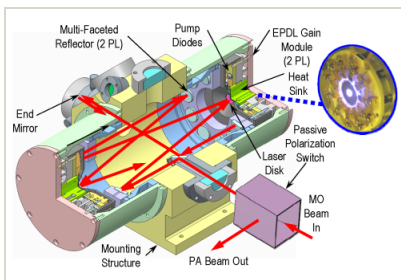
June 2016: Project Start

December 2016: Closed out

Closeout Documentation:

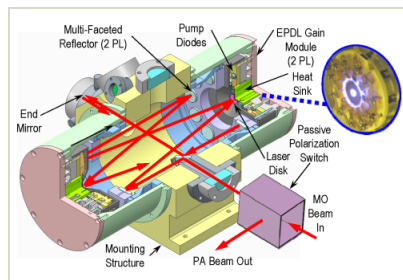
- Final Summary Chart(<https://techport.nasa.gov/file/140375>)

Images



Briefing Chart Image

Blue Laser Based on Frequency-Quadrupled Tm:Lu2O3, Phase I
(<https://techport.nasa.gov/image/135739>)



Final Summary Chart Image

Blue Laser Based on Frequency-Quadrupled Tm:Lu2O3, Phase I
Project Image
(<https://techport.nasa.gov/image/127547>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Aqwest, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

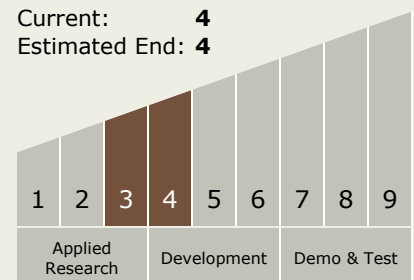
Carlos Torrez

Principal Investigator:

John Vetovec

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.1 Field and Particle Detectors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System